

# Young scientists in LCA—the “Ökobilanzwerkstatt”

Liselotte Schebek

Received: 14 June 2011 / Accepted: 27 August 2012 / Published online: 28 September 2012  
© Springer-Verlag 2012

## 1 Introduction

In every discipline, promotion and early integration of students and young scientist into research is an essential part of evolvement of science. Passing on of knowledge, exchange, and scientific discussion between different generations of researchers is highly important for the professional and personal development of young investigators. At the same time, it is indispensable to maintain a dynamic development and innovation process within a discipline which is needed to ensure emergence of novel ideas and progress of understanding.

During four decades of practice as well as methodological development, life cycle assessment (LCA) has evolved from a tool to a broad field of research. One of its main characteristics is being interdisciplinary: on the basis of a common methodological framework, it brings together knowledge from natural science and engineering as well as of economy and social sciences, and it brings together scientists with different disciplinary background. This has advantages as well as drawbacks: being strongly interdisciplinary is obviously adequate to the complex research questions encountered in the field of environmental problems, and research in different disciplines is needed to foster a sound understanding of the respective parts of the analyzed system, i.e., technological processes, impacts on ecosystems, or economic drivers. On the other

hand, the more and more broadening field of research incorporates a more and more fragmentation in subfields and a specialization of approaches which makes it even difficult to transfer insights from one LCA expert to the other.

In a heterogeneous field like this, communication and personal networking is indispensable, not only for a mutual understanding of scientists but also for the further canonization of a common methodology and for the self-conception of a common research field of LCA. Education and socialization of young scientists is one major contribution to the process of forming a self-conception of any research field; given the reasons discussed above, it may be needed even more urgently for the field of LCA.

## 2 The “Ökobilanzwerkstatt”—a workshop for young scientists in LCA

This edition of *Int J Life Cycle Assess* focuses on young scientists in LCA, including papers based on presentations at the 6. Ökobilanzwerkstatt at TU Darmstadt in 2010. What is the “Ökobilanzwerkstatt”—the “Ecobalance (LCA) Workshop”? This workshop for young scientist in LCA originated in the activities of the German Netzwerk Lebenszyklusdaten which has been funded in a project from 2004 to 2008 by the German Federal Ministry of Education and Research (BMBF) as part of their Research for Sustainability Program. The idea of a network was to create a platform for cooperation and exchange within Germany, where a broad and diverse community of LCA has evolved since the early 1990s, covering research organizations, companies, and consultancy. The German Netzwerk Lebenszyklusdaten hosted by Karlsruhe Institute for Technology (KIT) comprehended working groups on methodology as well as on application areas for LCA and supply on basic data for LCA; results from the project are provided in German language on [www.netzwerk-lebenszyklusdaten.de](http://www.netzwerk-lebenszyklusdaten.de).

---

L. Schebek (✉)  
Institute IWAR, Industrial Material Cycles,  
Technical University Darmstadt,  
Petersenstr. 13,  
64287 Darmstadt, Germany  
e-mail: l.schebek@iwar.tu-darmstadt.de

L. Schebek  
Department of Technology-Induced Material Flows,  
Karlsruhe Institute for Technology (KIT),  
Hermann-von-Helmholtz-Platz 1,  
76344 Eggenstein-Leopoldshafen, Germany

Activities on data provision, methodology, and IT are followed up by a current project on LCI data for bioenergy funded as part of the German government's Integrated Energy and Climate Programme.

As part of the Netzwerk Lebenszyklusdaten, the first Ökobilanzwerkstatt took place in 2005 in Bad Urach, a lovely countryside venue. The idea was to provide a specific kind of workshop for exchange of young scientist on LCA in Germany which did not exist until then. Its concept is based on the following characteristics:

- **Active participation:** the Ökobilanzwerkstatt is open to all young researchers and PhD students to present their “work-in-progress.” Only active participation is possible, i.e., presentation is mandatory. Also, young scientists are welcome who are at the beginning of their research and whose state of work is not yet mature for conference presentation. They present their research concept as well as first results or current problems they strive to resolve. Language of presentation is German, and ample time for discussion after each contribution is provided. Here, an intense enquiry on the presented issues and dispute on the scientific arguments between participants takes place which is facilitated by the use of the mother language.
- **Contributions from Senior Scientist:** in between the session of the participants' presentations, renowned scientists from the academia and industry are invited to give speeches. These either have the character of a lecture, presenting in detail advanced methodological procedures of LCA. Alternatively, the presentations deal with up-to-date issues of LCA and give an overview on the current state of research. Also in the case of invited speakers, time for extensive discussion exists, and most senior scientists participate in at least one full day of the program so that opportunity for further in-depth exchange is provided.
- **Personal networking:** the surrounding and organizational framework of the Ökobilanzwerkstatt supports an intimate seminar-like atmosphere which fosters personal exchange and later networking: about 30 participants meet for a continuous program of 3 days, where also joint activities like local “sight-seeing” events or barbecue ease an informal and communicative atmosphere.

These features have been appreciated by the participants from the very beginning. Young scientists take part in two or even three consecutive workshops and notification of the Ökobilanzwerkstatt happens from person to person. Nevertheless, a development could be observed during the last years: in the beginning, mainly young researchers from institutes well known for LCA-related research were present, in the following years, the range of organizations—universities and non-university institutes—broadened considerably. This

mirrors the general broadening of the application of LCA during the last decade. Not only due to its implementation in policy fields like the EU's Integrated Product Policy but also due to its advanced methodological level, LCA today is popular as systems analytical tool in many research projects and is even a mandatory part of technology research, e.g., in the EU seventh framework program and national programs in Germany. Although this broadening is an excellent development for the field of LCA in general, specific problems may arise for the young scientists: in some cases, they are the first and the only person in their research group occupied with LCA and miss scientific discussion and support on methodological issues. Several of the young researchers did not have any lectures or training on LCA before because this was not offered in their scientific program. Consequently, they lack essential knowledge and loose time to be fast on track of their research. Specifically for them, the Ökobilanzwerkstatt is highly welcome and supportive. However, the large demand of trained young scientists for LCA-related research today evidently cannot be met by events like the Ökobilanzwerkstatt alone but requires as generic basis a broader implementation of LCA knowledge in university education.

### 3 Broadening university education on LCA: the case of TU Darmstadt

At TU Darmstadt, the Faculty of Civil Engineering and Geodesy has had a major focus on environmental engineering and science since many years. Research covers, i.e., management of water resources, waste water, and waste treatment as well as traffic, infrastructure, and regional planning. Teaching on these issues has been incorporated in the diploma program of civil engineering since the 1970s. In 2008, however, the faculty launched a novel full-scale bachelor and master program on environmental engineering, where also environmental planning and assessment is included as area of advanced studies. This provided the opportunity to develop a curriculum on environmental assessment including LCA, based on the disciplinary background of environmental engineers.

In the bachelor program of environmental engineering, the students commence their studies in a broad scope of courses on natural science, mathematics, and engineering modeling approaches and take part in a basic course on environmental science. This course conveys an interdisciplinary approach of environmental issues: it explains natural science-based approaches for insights in mechanisms and changes of the natural environment, it presents information on global drivers and major environmental problems, and it introduces strategies for coping with these problems addressing the respective embedding in the societal and policy framework. From this knowledge base of the first

and second year studies, the students may take part as the first step of majoring in environmental assessment in a bachelor course on LCA which imparts a comprehensive introduction in process chain-based modeling and LCA methodology and covers training with a small case study of an LCA. This course enables the students for a first own application of LCA in the scope of a supervised bachelor thesis, which provides also the possibility to work on a research issue in cooperation with external partners from the industry. As a preceding opportunity for practical experience outside the university, an internship required for the bachelor program may be used.

In the master's program, a scope of courses for majoring in environmental assessment is offered which cover on one hand application fields like environmental management, sustainability in the building sector, and waste and material flow management. On the other hand, special courses on methodological issues are provided like mathematical basics and software of LCA. Finally, a master's thesis interconnects to current issues of research and also introduces to possible fields of interest for a student's scientific or business career. At TU Darmstadt, several interdisciplinary research activities have evolved during the last years which provide opportunities for LCA-related PhD, e.g., in energy science, product development, or material science. These are complemented by the establishment of graduate schools like the joint KIT-TU Darmstadt Graduate School on Climate and Environment. Here, an interdisciplinary postgraduate study program is provided for PhD students from several disciplines. As to LCA, a supplementary course is integrated for students without preliminary experience; those who already have experience take advantage from specialization in environmental science and of international exchange funded by the graduate school.

#### 4 Contributions from the sixth Ökobilanzwerkstatt

From September 29 to October 1 2010, 27 young scientists participated in the sixth Ökobilanzwerkstatt at TU Darmstadt. As a special incentive, the most interesting contributions were to be invited for submission of publications for *Int J Life Cycle Assess*. The selection was done by a committee consisting of Walter Klöpffer, Liselotte Schebek, Kai Sartorius, and Annika Weiss (two PhD students from KIT being members of the organizing team) and was based on the originality of the research as well as on the level of the scientific advancement of the work. Contributions from the following presenters of the sixth Ökobilanzwerkstatt are now included in this issue of *Int J Life Cycle Assess*:

*Boris Dresen* studied geography at RWTH Aachen and has been working since 2007 for Fraunhofer

UMSICHT as a junior scientist in the business unit “Resources Management” on the issue of sustainable criteria for (bio) energy, ecological balancing, and ecological footprints. He works on his PhD thesis about ecological and economical balances using geo-information systems. His contribution is based on the results of the joint BMBF project “Elimination of technical, legal and economic restraints for the feed-in of biogenous gases into the gas network” which has been carried out from 2006 to 2008.

*Daniela Dressler* is member of the department “Sustainable Energy and Environmental Technologies NEUTec” of the University of Applied Science and Arts Hildesheim/Holzminde/Göttingen, which conducts research on the energetic and material use of biomass. Since 2008, she has mainly been working on a project funded by BMBF on the management of climate change in the metropolitan area of Hannover/Braunschweig/Göttingen/Wolfsburg. Here, she applied LCA for investigation of energy production from biomass under changing climate conditions. Her contribution investigates the impact of regional factors for the generic assessment of bioenergy.

*Alexander Passer* received his civil engineering degree at Graz University of Technology and a post-graduate degree in “Building Science” at Danube University Krems. In 2010, he finished his PhD in the field of sustainable construction and is now a supervisor of the working group for sustainable buildings and assistant professor at the Institute of Technology and Testing of Building Materials at the Graz University of Technology. The working group focuses on the enhancement of sustainable building certification schemes, LCA of building and products (EPDs), and on the assessment of the environmental and economic performance of buildings. In his contribution, he evaluates methods for assessment of the environmental quality of buildings.

*Eva Szczechowicz* works on her PhD thesis in the field of multi-criteria assessment of electric vehicles at the Institute for High Voltage Technology (IFHT), department of sustainable energy systems at the RWTH Aachen University. Her research includes an overall ecological impact assessment of electric vehicles taking into account global emissions on country level as well as local emissions within cities using an integrated system modeling. Power generation, distribution, and transmission grids are part of these studies as well as regulatory aspects with respect to ecological impacts. Her contribution is on regional and local impacts from electromobility.

We thank the authors, their co-authors, and all the participants for their contributions and their spirit that supported the sixth Ökobilanzwerkstatt. Last but not least, the Ökobilanzwerkstatt would not have been possible without the intense work of the organizing team of PhD students from TU Darmstadt and KIT, Othman Mrani, Yalda Shayeghi, Kai Sartorius, and Annika Weiss,

to whom the credit for an excellent organization and management goes!

The Ökobilanzwerkstatt is organized on a yearly basis and is hosted alternately by universities or research organizations. Information on earlier and up-coming Ökobilanzwerkstatt events can be found under <http://www.oekobilanzwerkstatt.tu-darmstadt.de>.